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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,336	10/17/2006	Iori Yoshikawa	127630	6602

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EXAMINER	
CHANG, JON CARLTON	
ART UNIT	PAPER NUMBER
2624	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/589,336	YOSHIKAWA, IORI	
	Examiner	Art Unit	
	JON CHANG	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21, 40-66* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-16 and 43-58* is/are allowed.

6)☒ Claim(s) *17-21, 40-42, 59-66* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10/17/06* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/22/06, 10/17/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 17-21, 40-42 and 59-62 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. In claim 17, line 11, it is not clear what the phrase, "whose rotational angle..." relates to. It could relate "the other element" or to "imported along with a second image".

4. In the last clause of claim 59, the phrase, "first element and the second element of the mark formed on the object are detected **so that** the measurement directions are almost in the same direction within a measurement unit", is unclear and confusing. The use of the term "so that" indicates a purpose, e.g., a reason for the detection of the elements, but this does not appear to be the intent of the claim. It appears that it would be clearer if "so that" were replaced with "wherein" or perhaps "such that".

5. In claim 59, in the last clause, "almost in the same direction" is vague. It is not clear what the measurements directions are the same as. "The same direction" could refer to the measurement directions being the same as the first and second directions respectively, or it could mean that that the measurement directions are the same as each other, or something else.

6. Claims not mentioned specifically are indefinite by reason of their incorporation of claims 17 or 59.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 17, 40-42, 59-66 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,094,256 to Grodnensky et al. (hereinafter referred to as "Grodnensky").

9. As to claim 17, as best understood, Grodnensky discloses a transfer characteristic measurement method in which a transfer characteristic related to two different directions of an exposure apparatus that transfers a pattern formed on a mask onto an object is measured (Figs.1 and 2b), the method comprising:

a transfer process in which a mark containing a first element and a second element used to measure the transfer characteristic in the two directions is formed using the exposure apparatus (Fig.1; column 5, line 51 to column 6, line 10);

an image import process in which the object is set to a reference direction within a measurement unit and a first image, which is at least a part of the mark containing one of the first element and the second element, is imported along with a second image, which is at least a part of the mark containing the other element of the first element and

the second element whose rotational angle substantially differs from when the first image is imported by an angle a ($0°<\alpha<180°$) substantially the same as an intersecting angle of the two directions (Fig.1; column 5, lines 51 to column 6, line 10; column 7, lines 3-7; as seen in Fig.2a, the mark consists of elements; a second image, as depicted in Fig.2b show elements at a different rotational angle α, which is the same, inherently since the angle is defined by the angle between the elements); and

a measurement process in which the first image and the second image are processed and a first size and a second size related to the two directions of the mark are respectively measured (CD1 and CD2, in Figs.2a, 2b, and used in measurements described in column 7, line 41 to column 8, line 17).

10. As to claim 40, Grodnensky discloses an adjustment method of an exposure apparatus, the method comprising:

a measurement process in which a pattern transfer characteristic of the exposure apparatus that transfers a pattern formed on a mask onto an object is measured using the transfer characteristic measurement method of Claim 17 (Fig.1; see discussion of claim 1 above; column 1, lines 45-52, which describe the prior art environment in which the invention is utilized); and

an adjustment process in which the exposure apparatus is adjusted based on results of the measurement (column 11, lines 61-63; column 1, lines 45-52).

11. As to claim 41, Grodnensky discloses the adjustment method of the exposure apparatus of Claim 40 wherein the exposure apparatus has a projection optical system that projects an image of the pattern on the object, and the transfer characteristic

includes an image-forming characteristic of the projection optical system (Fig.1; column 1, lines 13-15).

12. As to claim 42, Grodnensky discloses a device manufacturing method that includes a transfer process in which a pattern formed on the mask is transferred on a photosensitive object using the exposure apparatus whose pattern transfer characteristic has been adjusted according to the adjustment method of Claim 40 (column 1, lines 45-52, which describes the prior art environment in which the invention is utilized).

13. As to claim 59, as best understood, Grodnensky discloses a transfer characteristic measurement method in which a transfer characteristic related to a first direction and a second direction that intersect each other of an exposure apparatus that transfers a pattern formed on a mask onto an object is measured (Figs.1 and 2b), the method comprising:

a formation process in which a mark containing a first element whose measurement direction substantially coincide with the first direction and a second element whose measurement direction substantially coincide with the second direction is formed on the object using the exposure apparatus (Fig.1; column 5, lines 51-60; column 6, lines 3-10; column 7, lines 3-7; the mark 108 consists of elements, each pair at a particular angle or direction; measurement direction relates to how the CD bars are rotated by angle α); and

a measurement process in which a size related to the measurement direction is

measured and the first element and the second element of the mark formed on the object are detected so that the measurement directions are almost in the same direction within a measurement unit (column 7, lines 41-49; column 7, line 65 to column 8, line 17).

14. Regarding claims 60-62, see the discussion above for claims 40-42.

15. As to claim 63, Grodnensky discloses a transfer characteristic measurement method in which a transfer characteristic related to a first direction and a second direction that intersect each other of an exposure apparatus that transfers a pattern formed on a mask onto an object is measured (Figs.1 and 2b), the method comprising:

a formation process in which a mark containing a first element and a second element whose measurement directions substantially coincide with the first direction and the second direction is formed as a first mark and a second mark whose rotational angle differs at substantially the same angle as an intersecting angle of the first direction and the second direction on the object using the exposure apparatus (Fig.1; column 5, line 51 to column 6, line 10; column 7, lines 3-7; the mark 108 consists of elements, each pair at a particular angle or direction; measurement direction relates to how the CD bars are rotated by angle α; as seen in Fig.2b, the rotational angle α between the two elements equates to the intersecting directions on the object); and

a measurement process in which one of the first element and the second element of the first mark formed on the object and the other of the first element and the second element of the second mark formed on the object whose measurement direction substantially coincides with the one of the first element and the second element of the

first mark are detected, and a size of the first element of the mark and a size of the second element of the mark related to the measurement direction are respectively measured (Figs.2a and 2b; column 7, line 41 to column 8, line 17; CD1 is a width measurement corresponding to the elements in one direction, and CD2 is a width measurement corresponding to the elements in the other direction).

16. Regarding claims 64-66, see the discussion above for claims 40-42.

Allowable Subject Matter

17. Claims 1-16 and 43-58 are allowed.

18. Claims 18-21 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Citation of Pertinent Prior Art

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent Application Publication 20050106480 to Suwa discloses measuring the width of line of two linear patterns which overlap

U.S. Patent Application Publication 20060251317 to Eran et al. teaches width measurement in a particular direction.

U.S. Patent 5,181,258 to Nagao et al. discloses a linear pattern recognizing method.

U.S. Patent 4,547,895 to Mita et al. discloses measuring the width and angle of pattern (column 9 line 65 to column 10 line 51).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JON CHANG whose telephone number is (571)272-7417. The examiner can normally be reached on M-F 8:00 a.m.-6:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571)272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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